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Water Gun

Identify a Need

In this project we needed to build a water gun, without using already built materials. We had to build the parts on our own using PVC tubes, a broom, a bottle and other materials.

Research a Problem

Our problem was that we didn’t know how we could make enough pressure so water can expulse in great quantities and in a straight line without using any, already built materials.

Gather Information

We researched and found out the parts that a water gun had to have so that our project could work. It consists of a reservoir (the main water tank in separate chamber water guns), a pump (the sliding device that sucks water out of the reservoir and forces it into the pressure chambers), Check valves, or one-way valves, that use springs to seal off the flow of water in one direction and pressure release valves that are used in commercial water guns to eliminate excessive and potentially dangerous pressure.

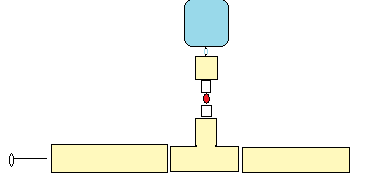
Design a solution

Our solution was that we should follow what our findings said. So, we used a 2 liter water bottle for the reservoir, a portion of a broom stick with foamy paper attached to one and a PVC tube for the pump, Bought PVC check valves that made the water con in one direction. We also attached a hose to connect the pump to a PVC tube that had a pressure release valve that controlled the water.

Start Brainstorming

We had some complications when it came to hold everything in place, so we brainstormed and decided to use parts of jewelry boxes and long colored rubber bands to keep everything in place.

Construct a Model



Evaluate Constraints

**How well will the parts stand up to repeated use?**

Due to the fact that we used PVC materials, the parts of the water gun we constructed will stand up to repeated use. They are resistant and can be reused if we take off the PVC glue from the PVC pipes.

**Will the product be likely to break or cause injuries?**

The product we constructed, the water gun, cannot break or cause injuries. If it does, then it is intended upon the user of it. You can only break it if a person uses a special instrument to cut it and it causes injury if a children underage hits another person with the water gun or aims the water gun at a person´s face.

**How much money can the finished product cost?**

Approximately, we only purchased the PVC connectors and the check valve. We obtained the PVC pipes from our houses and we grabbed a simple plastic bottle. The connectors cost about 80 lempiras and the check valve about 144 lempiras.

**What should be the overall size of the product?**

We wanted a regular size for the water gun to provide comfort for us in the presentation. Because the pipes were long, the water gun has a full-size length.

**How should the product look?**

The product should contain all the supplies for it to function, but we are still troubleshooting and designing to improve it. Our device looks like a water gun.

**We realized our constriction was the nozzle.**

Make Trade-Offs

It our project, we made one or two trade-offs. We exchanged a 1-liter plastic bottle with a 2-liter plastic bottle (we preferred effectiveness over our comfort).

Build Prototype



Troubleshoot Design and Redesign

After we constructed our first model, we realized that our water gun did not work. It needed the check valve to improve the water expulsing out of the nozzle. After we made the corrections, we came up with an improved design. We included a wider nozzle, the check valve, and a metal hose. We positioned foam in the pump to create greater pressure. We shifted some PVC pipes and connectors.

Communicate the Results

From this project, we learned how force affects the pressure inside a confined liquid. The pressure in the water leaving the nozzle diminishes while the water in the chamber and in the pipes is pressurized by the air. This represents Pascal’s Principle, “when force is applied to a confined liquid, the change in pressure is transmitted equally to all parts of the fluid.”